DOCUMENT RESUME

ED 410 398 CE 074 536

AUTHOR	Tay, Kenneth Kim; Hill, Joseph A.; Ward, Connie M.
TITLE	Factorial and Structural Validity of Holland's Hexagonal Model for an Asian Student Population.
SPONS AGENCY	National Career Development Association, Alexandria, VA.; Association for Computer-Based Systems of Career Information.
PUB DATE	1997-08-00
NOTE	18p.; Paper presented at the Annual Meeting of the American Psychological Association (Chicago, IL, August 15-18, 1997).
PUB TYPE	Reports - Research (143) -- Speeches/Meeting Papers (150)
EDRS PRICE	EDRS Price MF01 Plus Postage. PC Not Available from EDRS.
DESCRIPTORS	*Career Choice; Career Education; Career Planning; Cultural Background; *Cultural Differences; Cultural Influences; Educational Psychology; Foreign Students; Higher Education; Models; *Personality; *Personality Measures; *Validity
IDENTIFIERS	Asians; *Hollands Hexagonal Model

ABSTRACT

A study examined the utility of Holland's hexagonal model as a culturally appropriate theoretical framework for U.S. career psychologists working with Asian international students. Chinese-descent international students enrolled in three Southeastern universities (n=170) completed three instruments: Holland's Self-Directed Search (SDS), an empirically derived questionnaire that examined a variety of social and career factors that influence career choice, and a demographic questionnaire. The SDS data subjected to a series of exploratory factor analyses suggested two models composed of four or five factors as alternatives to Holland's six-factor model. Confirmatory factor analyses (CFAs) revealed that goodness of fit between the SDS data and all three models was less than optimal to be considered statistically robust. However, Holland's six-factor model did account for a considerable portion of total variance underlying the SDS data. Based on the CFA findings, the similarity between enterprising and conventional typologies may reflect an entrenched tradition of commerce and business entrepreneurship perpetuated in many overseas Chinese families. Participants enrolled in technical majors exhibited greater career-interest congruence than their peers in nontechnical majors. Results supported a multicultural aspect of Holland's model that transcends the world of work in many cultures. (Appendixes include seven tables and six figures.) (YLB)

****
* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *
****

ED 410 398

Factorial And Structural Validity of Holland's Hexagonal Model For An Asian Student Population

by

Kenneth Kim Tay, PhD
The Counseling Center
Columbus State University

Joseph A. Hill, PhD
Department of Counseling
& Psychological Services
Georgia State University

Connie M. Ward, PhD
Independence Practice
Adjunct Faculty
Georgia State University

U.S. DEPARTMENT OF EDUCATION
Office of Educational Research and Improvement
EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)
☐ This document has been reproduced as received from the person or organization originating it.
☐ Minor changes have been made to improve reproduction quality.
• Points of view or opinions stated in this document do not necessarily represent official OERI position or policy.

PERMISSION TO REPRODUCE AND DISSEMINATE THIS MATERIAL IN OTHER THAN PAPER COPY HAS BEEN GRANTED BY

K Tay

TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)

Paper presented at the Annual Convention
of the American Psychological Association in Chicago,
August 15-19, 1997.

This study is based on the author's dissertation, which was funded by a research grant awarded by the National Career Development Association and the Association for Computer-based Systems for Career Information

CE 074 536

BEST COPY AVAILABLE

Factorial And Structural Validity of Holland's Hexagonal Model

For An Asian International Student Population

Abstract

by

Kenneth Kim Tay

One hundred and seventy Chinese-descent international students enrolled in one of three major universities in the Southeastern U.S. responded to three instruments--(a) Holland's Self-directed Search (SDS), (b) an empirically derived questionnaire that examined a variety of social and career factors that influence career choice, and (c) a demographic questionnaire.

The SDS data subjected to a series of exploratory factor analyses suggested two competing models comprised of either four or five factors as possible alternatives to Holland's six-factor model. Confirmatory factor analyses (CFA) revealed that the goodness of fit between the SDS data and all three models were less than optimal to be considered as statistically robust. However, Holland's six-factor model did account for a considerable portion of total variance underlying the SDS data.

Based on the CFA findings, the similarity between enterprising and conventional typologies may reflect an entrenched tradition of commerce and business enterpreneurship perpetuated in many Overseas Chinese families. Multiple analyses of variance indicated that participants enrolled in technical majors exhibited greater career-interest congruence than their peers in nontechnical majors. Results in this study lend support that there might be a multicultural aspect to Holland's model which transcends the world of work in many cultures.

Factorial And Structural Validity of Holland's Hexagonal Model For An Asian International Student Population

by

Kenneth Kim Tay

Statement of the Problem

Research investigating cultural diversity of Holland's theory suggests that his model of the world of work may offer useful explanations of vocational behaviors across cultures. Since 1980, more than 100 cross-national studies in over 26 countries have reported some encouraging results. Recent studies assessing the needs of international students pursuing higher education in the United States (U.S.) have indicated a need for career counseling. The utility of Holland's hexagonal model as a culturally appropriate theoretical framework for U.S. (and other) career psychologists working with a group of Asian international students was examined in this study.

Methods

One hundred and seventy Asian international students (n = 170) enrolled in one of three major universities in the Southeastern U.S. responded to three instruments--(a) Holland's 1994 Self-directed Search (SDS, Edition R), (b) the Social and Career Questionnaire (SCQ) that examined a variety of social and career factors that influence career choice, and (c) a demographic questionnaire. Respondents were of Chinese descent originating from Hong Kong, Taiwan, Malaysia, or Singapore.

Results

Using a series of exploratory common factor analysis (EFA) via principal axis extraction and oblimin rotation, the SDS data

were "forced" to load on one factor through six factors. At each successive increment level of factor analysis, the associated pattern matrix was scrutinized as a means to gauge the possible number of factors underlying the obtained SDS data set. Tables 1 through 6 show the pattern matrix of the factor loadings for each of the SDS scale on one through six factors. The EFA results of the SDS data suggested two competing models comprised of either four or five factors as possible alternatives to Holland's six-factor model. Figures 1, 2, and 3 show a pictorial illustration for the three competing models.

Using Linear Structural Relations computer program (LISREL-VIII), confirmatory factor analyses (CFA) revealed that the goodness of fit between the SDS data and the proposed four- and five-factor models as well as Holland's six-factor model were less than optimal to be considered as statistically robust models. All three models, however, did account for a considerable portion of total variance underlying the SDS. Results also indicated that the factor correlation (Phi) between the enterprising and conventional personality typologies was 0.82.

Figures 4, 5, and 6 show the LISREL-CFA representation of the three models, together with indices of fit for each of the model. The LISREL-CFA program provides four indices of the goodness of fitfor each of the model as a whole: Chi square, Goodness of Fit (GFI), Adjusted Goodness of Fit (AGFI), and Root Mean Square Residual (RMR). Chi-square tests evaluate the magnitude of the differences between the actual and theoretical/predicted covariance matrix structure. Non significance indicates a good fit. Since

Chi square is sensitive to large sample size, indices of GFI, AGFI, and RMR are also considered. The GFI and AGFI both indicate the relative portion of variance and covariance accounted for by the hypothesized model. The AGFI differs from the GFI only in that the numbers of parameters freely estimated are taken into account. Both GFI and AGFI range from 0.0 to 1.0, with a magnitude of and above 0.90 suggesting a good fit. The RMR, ranges also from 0.0 to 1.0, refers to the average of the residual variances and covariances remaining when the hypothesized model has been fitted. A close-to-zero RMR is indicative of a good model fit.

Data on the 19 Likert-type SCQ items were subjected to statistical item analyses for its Cronbach's alpha, a measure of instrument reliability for internal consistency. Following deletion of poor items (i.e., $r < .30$), the reduced version of the SCQ, which consisted of 8 items with a Cronbach's alpha of 0.64, was subsequently subjected to principal components analyses using varimax rotation. Following rotation, the three-factor solution was selected as most interpretable. The three factors underlying the SCQ collectively accounted for 61.5% of total variance and are identified as Holland's career interests (Factor 1), Professional exposure (Factor 2), and Career information (Factor 3). Table 7 show the pattern matrix of factor loadings for the three SCQ factors.

Two separate multiple analyses of variance using gender, academic classification (undergraduate and graduate), and type of major (technical and nontechnical), examined group differences in relation to the three SCQ factors and Holland's assessment

constructs of congruence and diferentiation. Results indicated that students enrolled in technical majors exhibited greater career-interest congruence than their peers in nontechnical majors (F = 6.8, d.f. = 160, p = .0005).

Conclusions

In general, the SDS appears to have adequate factorial validity in measuring Holland personality typologies for this population of Asian international students. The six vocational personality typologies seem valid in differentiating the students' vocational orientation. The uniqueness, however, of the enterprising and the conventional typologies (r = 0.82) suggests that they may not be as qualitatively distinct to substantially differentiate the Asian students' vocational orientation to the extent that they do for U.S. students. Holland (1994) reported an intercorrelation of the enterprising and conventional typologies, based on a large U.S. sample, to be 0.43. One cultural interpretation is that the greater similarity found between the enterprising and conventional typologies in this study may reflect an entrenched cultural tradition of commerce and business enterpreneurship perpetuated in many Overseas Chinese families.

Findings in this study raised some questions regarding the structural validity of Holland's hexagonal model for cross-national use with this group of Asian students. However, to Holland's credit, his model did account for a considerable portion of total variance. This lends support that there might be a universal or multicultural aspect of his model which transcends the world of work in many cultures.

Table 1

Pattern matrix of the factor loadings for each SDS scale on one factor

	FACTOR 1
Ese2	.716
Ese1	.686
Eo	.669
Ec	.663
Sc	.661
Cse1	.652
Ea	.645
Cse2	.636
Cc	.584
Ca	.554
Sa	.518
Sse2	.517
Co	.497
So	.439
Ac	.439
Sse1	.424
Ase2	.357
Ao	.336
Aa	.327
Ise1	-.315
Ic	-.301
Ase1	.284
Ia	-.283
Rse1	-.258
Ra	-.163
Rc	-.075
Ro	-.041
Ise2	-.035
Io	-.021
Rse2	-.009

Table 2

Pattern matrix of the factor loadings for each SDS scale on two factors

	FACTOR 1	FACTOR 2
Ese2	.703	-.088
Ec	.700	.104
Eo	.681	.008
Ese1	.663	-.132
Ea	.661	.029
Sc	.657	-.052
Cse1	.636	-.100
Cse2	.624	-.079
Cc	.612	.079
Ca	.572	.044
Sa	.535	.041
Sse2	.521	.033
Co	.524	.082
So	.464	.078
Ac	.443	-.006
Sse1	.436	.030
Ao	.354	.060
Ase2	.343	-.081
Aa	.316	-.065
Ase1	.282	-.024
Ra	-.003	.774
Rse1	-.113	.741
Ro	.111	.681
Ic	-.172	.668
Ise1	-.189	.660
Rc	.067	.644
Ia	-.162	.611
Rse2	.101	.488
Io	.084	.464
Ise2	.060	.424

Table 3

Pattern matrix of the factor loadings for each SDS scale on three factors

	FACTOR 1	FACTOR 2	FACTOR 3
Cse2	.792	-.077	-.172
Ese2	.773	-.091	-.023
Ese1	.738	-.135	-.034
Ces1	.725	-.101	-.059
Ea	.715	.028	-.001
Eo	.657	.003	.115
Ca	.651	.046	-.055
Cc	.605	.076	.079
Ec	.603	.094	.227
Co	.588	.084	-.040
Sc	.457	-.067	.395
Sse2	.366	.021	.324
Ra	.017	.773	-.035
Rse1	.024	.757	-.237
Ro	.073	.678	.070
Ic	-.155	.667	-.049
Ise1	-.207	.659	.006
Rc	.092	.644	-.038
Ia	-.240	.611	.106
Rse2	.176	.493	-.111
Io	-.110	.465	.325
Ise2	.080	.423	-.027
Ao	-.067	.044	.770
Ac	.038	-.029	.757
Aa	-.088	-.092	.732
Ase1	-.107	-.047	.695
Ase2	-.000	-.105	.624
So	.223	.065	.449
Sa	.314	.027	.419
Sse1	.268	.018	.319

Table 4
Pattern matrix of the factor loadings for each SDS scale on four factors

	FACTOR 1	FACTOR 2	FACTOR 3	FACTOR 4
Cse2	.755	-.061	-.166	.094
Ese1	.720	-.111	-.018	.075
Eo	.718	.055	.221	-.090
Cse1	.686	-.086	-.069	.123
Ea	.684	.048	.001	-.100
Ese2	.678	-.096	-.126	.299
Ca	.669	.079	.010	-.030
Co	.633	.125	.055	-.096
Cc	.569	.089	.059	.131
Ec	.508	.087	.104	.329
Ra	.096	.823	.107	-.254
Rse1	.069	.775	-.132	-.206
Ro	.093	.693	.117	-.066
Rc	.141	.673	.060	-.163
Ic	-.235	.636	-.158	.177
Ise1	-.338	.623	-.181	.318
Ia	-.296	.584	.018	.139
Rse2	.168	.496	-.088	-.017
Io	-.194	.437	.184	.273
Ise2	.046	.414	-.058	.070
Aa	-.013	-.049	.843	-.095
Ac	.073	.004	.078	.048
Ao	-.046	.067	.760	.084
Ase1	-.101	-.034	.647	.115
Ase2	.035	-.078	.645	.024
Sc	.261	-.121	.095	.682
Sse1	.075	-.038	.028	.629
Sse2	.180	-.029	.041	.622
Sa	.179	-.003	.207	.479
So	.104	.038	.255	.432

Table 5

Pattern matrix of the factor loadings for each SDS scale on five factors

	FACTOR 1	FACTOR 2	FACTOR 3	FACTOR 4	FACTOR 5
Cse2	.821	-.023	-.063	.067	.163
Ese1	.744	-.092	.037	.010	.030
Cse1	.741	-.054	.020	.017	.146
Ese2	.740	-.076	-.049	-.157	.190
Ea	.673	.040	-.008	-.110	-.087
Eo	.646	.211	.121	-.071	-.396
Ca	.637	.067	-.022	-.027	-.176
Cc	.587	.098	.091	-.082	.031
Co	.568	.095	-.040	-.056	-.346
Ec	.539	.088	.131	-.265	.095
Ra	.028	.800	.041	.098	-.283
Rse1	.064	.788	-.095	.200	-.026
Ic	-.176	.664	-.084	-.075	.285
Ise1	-.258	.659	-.092	-.185	.407
Ro	.010	.659	-.013	-.159	-.362
Rc	.094	.655	.016	.054	-.203
Ia	-.285	.573	.007	-.159	.081
Rse2	.192	.516	-.030	.075	.084
Ise2	.122	.473	.070	.100	.303
Ase1	-.058	.009	.801	.038	.220
Aa	-.056	-.055	.793	.012	-.182
Ac	.064	.012	.786	-.048	-.050
Ase2	.073	-.034	.781	.122	.153
Ao	-.087	.043	.681	-.190	-.171
So	.028	-.045	-.071	-.698	-.244
Sa	.126	-.080	.044	-.695	-.175
Sc	.307	-.145	.077	-.629	.181
Sse2	.242	-.039	.062	-.526	.246
Sse1	.147	-.044	.059	-.518	.295
Io	-.237	.390	.068	-.435	-.121

Table 6

Pattern matrix of the factor loadings for each SDS scale on six factors

	FACTOR 1	FACTOR 2	FACTOR 3	FACTOR 4	FACTOR 5	FACTOR 6
Ca	.773	-.046	-.012	.105	-.124	.061
Co	.769	.008	-.024	.188	-.304	.011
Cse2	.710	-.023	-.079	-.129	.295	-.026
Eo	.666	.169	.133	.021	-.207	-.256
CseI	.650	-.060	.006	-.145	.242	-.022
Cc	.647	-.071	.092	-.057	.013	.169
Ese1	.609	.038	.024	-.163	.196	-.189
Ea	.603	.112	-.010	-.168	.011	-.114
Ese2	.561	-.007	-.069	-.379	.227	-.080
Ec	.437	.073	.122	-.367	.044	.034
Ra	-.022	.868	.054	.117	-.108	.027
Rse1	-.069	.832	-.100	.060	.173	.105
Rc	.000	.759	.022	.014	-.043	-.022
Ro	.071	.602	.005	.020	.357	.114
Rse2	.032	.556	-.041	-.112	.209	.064
Ase1	-.184	.052	.796	-.149	.254	-.006
Aa	-.021	.035	.796	.072	-.105	-.140
Ac	.115	-.036	.790	-.000	-.058	.032
Ase2	.071	-.103	.771	.039	.189	.072
Ao	-.014	.025	.689	-.057	-.241	.006
Sse2	.003	.051	.036	-.751	.041	-.029
Sc	.180	-.136	.067	-.699	-.106	.024
Sse1	-.035	-.041	.039	-.683	.031	.073
Sa	.108	-.012	.055	-.553	-.443	-.073
So	.036	.029	.087	-.509	.512	-.082
Io	-.046	.066	.086	-.146	-.483	.429
Ise1	-.159	.093	-.098	-.148	.033	.816
Ic	-.036	.127	-.085	.005	.006	.757
Ia	-.045	.045	.022	.083	-.250	.716
Ise2	.175	.097	.064	.052	.212	.516

Table 7

Principal components analysis of the SCQ

SCQ Item	Factor 1	Factor 2	Factor 3
# 8(career reference books)	-.04	.25	.71
# 9(employment outlook)	.14	-.04	.80
# 2(teachers'/professors' advice)	-.09	.77	.16
# 5(working professionals' advice)	.23	.71	.20
# 11(related work experience)	.32	.56	-.18
# 13(activities I enjoy)	.76	.23	.00
# 14(skills I have/like to learn)	.86	.09	.07
# 15(occupations I like)	.79	.00	.06

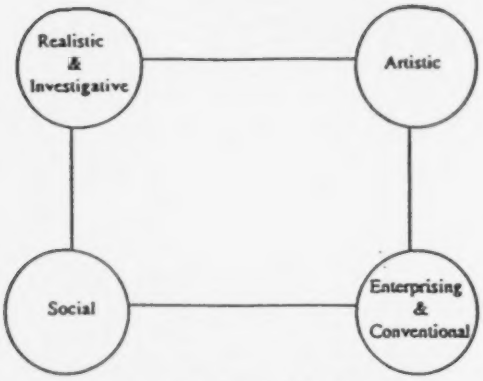

Figure 1. The four-factor model as suggested by the EFA findings.

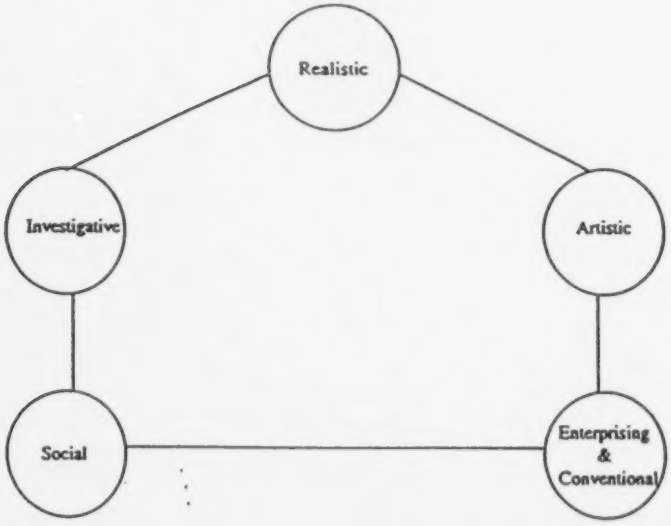

Figure 2. The five-factor model as suggested by the EFA findings.

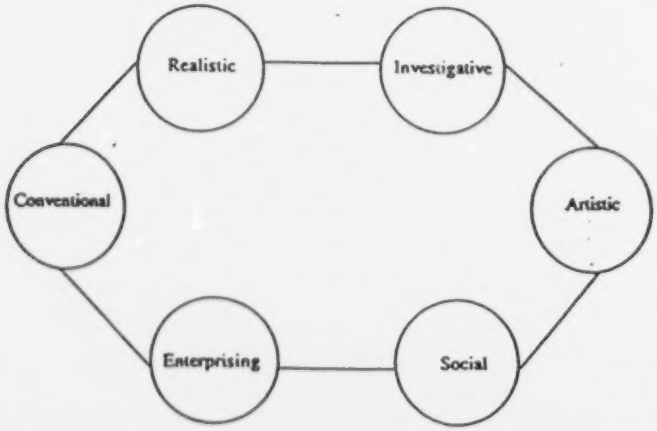

Figure 3. The six-factor model as conceptualized in Holland's model.

BEST COPY AVAILABLE

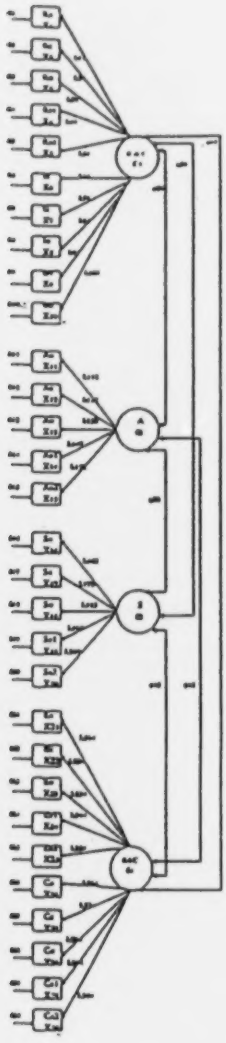

Figure 4 LISREL CFA model of four factors

Goodness of Fit Indices for the Four-factor model

Index	Value
Chi-square with 399 df	1655 (p = 0.0)
GFI	0.58
AGFI	0.51
RMR	0.11

BEST COPY AVAILABLE

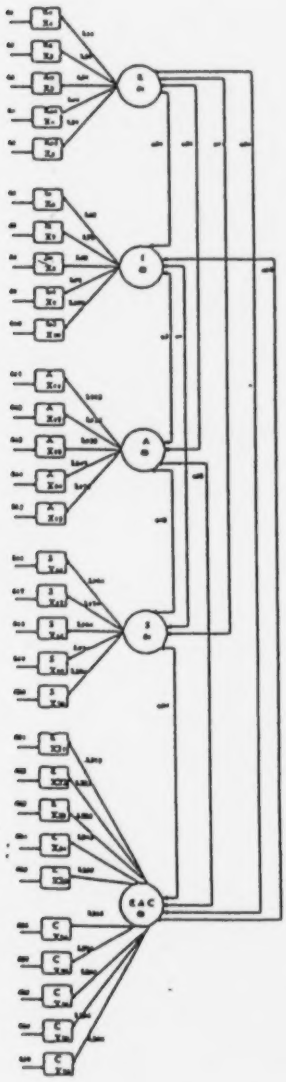

Figure 5. LISREL CFA Model of Five Factors

Goodness of Fit Indices for the Five-factor model

Index	Value
Chi-square with 399 df	1430.12 (p = 0.0)
GFI	0.62
AGFI	0.55
RMR	0.093

BEST COPY AVAILABLE

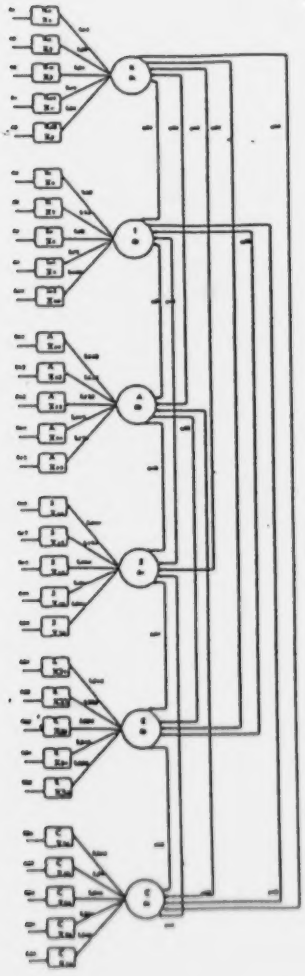

Figure 6. LISREL CFA Model of Six Factors (i.e., Holland's Model)

Goodness of Fit Indices for the Six-factor model

Index	Value
Chi-square with 399 df	1356.73 (p = 0.0)
GFI	0.62
AGFI	0.55
RMR	0.091

BEST COPY AVAILABLE